



3<sup>rd</sup> Semi-Annual Status Report

for

**The Roanoke Ozone Early Action  
Compact Area**

June 30, 2004



## **PROJECT BACKGROUND AND SUMMARY TO DATE**

This report represents the 3<sup>rd</sup> semi-annual status report for the Roanoke Early Action Compact Area in Virginia, which consists of Botetourt and Roanoke Counties, Roanoke and Salem Cities, and the Town of Vinton. As such, this report documents the status and progress made towards the development and implementation of an Early Action Plan (EAP) to address ground level ozone air pollution in the area. Specifically, this report covers the period from January 1, 2004 to June 30, 2004.

The Early Action Compact program has been developed and endorsed by the U. S. Environmental Protection Agency as an alternative to the normal ozone nonattainment designation and attainment process. The program involves early action on the part of areas that marginally exceed the 8-hour ozone standard to reduce ozone related air pollutants and improve air quality. This effort has been initiated by the local area, the Department of Environmental Quality (DEQ), and the Environmental Protection Agency (EPA) to serve as an alternative to the traditional nonattainment designation and planning process. The purpose of this early action plan is to proactively improve local air quality and come into compliance with the ozone standard earlier than the Clean Air Act would otherwise require for the area. In return, EAC areas receive a deferral of formal nonattainment designation as long as the commitments and milestones of the area's EAP are met. If it is then demonstrated by 2007 that the local area has come into compliance with the ozone standard, the deferred nonattainment designation will be withdrawn altogether.

The EAC process in Roanoke area began back in the fall of 2002, with the establishment of the Roanoke Early Action Task Force and the formal development and signing of the Early Action Compact in December 2002. Moving forward, a series of required documents have been produced, culminating in the submission of the official EAP in March 2004. Provided below is listing and timeline of the products and documents provided by the Roanoke EAC effort:

- **December 31, 2002** – Early Action Compact for the Roanoke Area.
- **June 16, 2003** – Potential local control list submission.
- **June 30, 2003** – 1<sup>st</sup> annual status report for January to June 2003.
- **December 31, 2003** – 2<sup>nd</sup> annual status report for July to December 2003.
- **March 31, 2004** – Completed local Early Action Plan submitted to DEQ & EPA.

All these documents, along with other information concerning the EAC program and other EAC areas, can be viewed and retrieved at from the following EPA web site:

<http://www.epa.gov/ttn/naaqs/ozone/eac/index.htm>

Efforts on the state and local levels have now moved towards the implementation of the emissions control measures and other actions committed to in the EAP.

The remainder of this status report documents the major actions, milestones, and events that have occurred since the submission of the last report. This report will also summarize the early action plan and associated technical analysis submitted in March 2004. Finally, a discussion of the status and projected schedule for implementation of individual control measures and future milestone documents, such as the formal State Implementation Plan (SIP), is also provided.

## **PROGRESS SUMMARY (JANUARY TO JUNE 2004)**

Provided below is a listing of major events held and actions taken during the period covered by this status report toward the development and implementation of the local ozone air quality improvement plan and associated nonattainment implications:

**January 19, 2004** – Presentation to Regional Chamber of Commerce concerning Ozone EAP.

**January 20, 2004** – Ozone EAP Draft Public Hearing.

**January 21, 2004** – Interview with WVTF Public Radio for broadcast.

**January 22, 2004** – Interview with News 7 (CBS) for 5:00 p.m. and 6:00 p.m. news.

**January 20, 2004** – Formal resolution of EAP adoption (Town of Vinton).

**January 27, 2004** – Formal resolution of EAP adoption (Roanoke County).

**January 29, 2004** – Formal resolution of EAP adoption (City of Salem).

**February 17, 2004** – Formal resolution of EAP adoption (City of Roanoke).

**February 24, 2004** – Formal resolution of EAP adoption (Botetourt County).

**February 27, 2004** – Meeting of the Roanoke Early Action Task force.

**March 11, 2004** – Conference call with EPA Region III concerning the technical assessment (air quality modeling) effort in support of the early action effort.

**March 24, 2004** – Effective date for State regulations that establish the EAC areas in Virginia as ozone precursor emissions control areas that are now subject to various existing source control (RACT) requirements.

**March 31, 2004** – Submission of the official Roanoke Early Action Plan to DEQ and EPA.

**April 22, 2004** – Roanoke EAP submission press event.

**April 30, 2004** – Published final EPA rule for air quality designations and classifications for the 8-hour ozone standard and deferral of the effective date of nonattainment designations for approved early action compact areas, including the Roanoke area.

## **MARCH 31ST EARLY ACTION PLAN SUMMARY**

The main product of the EAC effort has been the development of an ozone early action plan for the Roanoke area. The purpose of this plan is to develop and implement a comprehensive strategy to bring the Roanoke area into compliance with the 8-hour ozone standard as soon as possible. In doing so, consideration given to the fact that local area ozone levels are impacted by both local emissions activities and the transport of ozone pollution into the Roanoke area from other areas. As a result, the strategy developed relies on emissions control measures on all levels (local, state, and national) needed to bring the area into compliance with the ozone standard by 2007. The plan contains demonstrations based on emissions and air quality

modeling showing that significant local/regional emissions reductions and a corresponding decrease in local ozone concentrations will occur as a result of the implementation of the plan that are sufficient to bring the area into compliance. This plan has been developed by the Roanoke Early Action Task Force, endorsed and adopted by the local governments involved and submitted to DEQ and EPA on March 31, 2004. The key components of the plan are summarized below.

### **Emission Reduction Analysis**

This section summarized the air pollutant emissions inventory and reduction analysis performed to support the Roanoke Ozone Early Action Plan. Typical daily inventories for volatile organic compounds (VOC) and oxides of nitrogen (NO<sub>x</sub>) during the ozone season, expressed in tons per day, were developed for this purpose. These inventories include baseline, interim, and future projection years to determine historic, current, and future emissions levels as part of the air quality plan development process. The major source categories used to present this inventory data are:

- **Stationary Point Sources**  
Large utility and industrial facilities with significant individual emissions.
- **Mobile Sources**  
Motor vehicles operated on public roads such as interstates, freeways, and local roads.
- **Area Sources**  
Small individual sources of emissions such as gasoline distribution and marketing, solvent usage, and others.
- **Nonroad Mobile Sources**  
Motor vehicles and equipment such as lawn and garden tools, construction equipment, locomotives, and aircraft.

The first inventory developed for this process was the baseline emissions inventory. 1999 was selected for this purpose, since the ozone episode being modeled to support the EAP process occurred during the summer of 1999. This inventory serves as a baseline estimate of area emissions during the time when the modeled episode occurred. This inventory reflects actual emissions in the area during this year.

The second inventory to be developed was the interim (current) year emissions inventory. 2002 was selected for this purpose because this is the latest year for which a comprehensive inventory for all sources has been developed. This inventory serves to represent existing emissions levels in the local area and can also be compared to the baseline inventory to determine emissions trends. This inventory also reflects actual emissions in the area during this year.

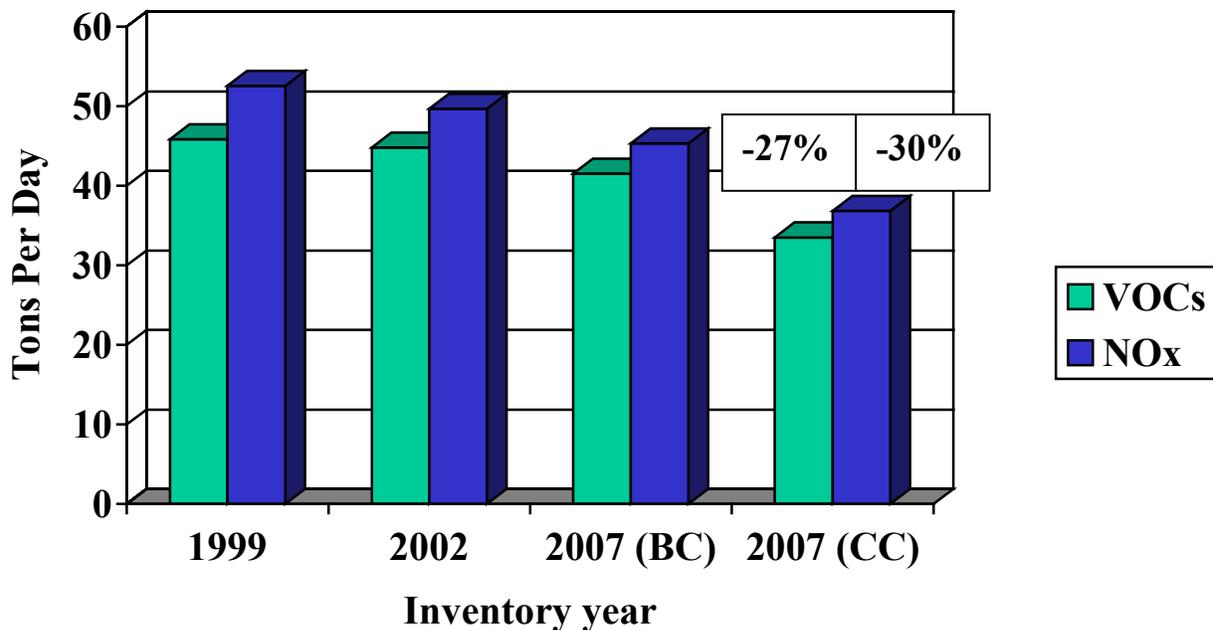
The last two inventories developed for this process are predicted future year emissions inventories that represent base case (uncontrolled) and control case (controlled) emissions scenarios. The year selected for this purpose was 2007 which is the year by which the area must come into compliance with the ozone standard. The future base case inventory represents uncontrolled emissions projected with appropriate growth factors. The exception to this is the mobile source inventory that contains some reductions associated with previous federal/state motor vehicle controls. The future control case inventory represents the application of all control expected to be implemented in the local area by the attainment year. This also includes the local impact of additional federal/state control measures, and the local

control measures selected as part of the EAP process. The results of this analysis are presented in a summary table and bar graph presented below:

**Table 1: Roanoke EAP Emissions Inventory Summary**

Source Category	1999 (Baseline)	2002 (Interim)	2007 (Base Case)	2007 (Control Case)
<b><i>Volatile Organic Compound (VOC) Emissions in tons/day</i></b>				
Point Sources	4.551	3.518	3.927	3.927
Area Sources	18.845	19.360	20.044	15.300
Non-road Sources	5.683	5.726	5.803	3.804
Mobile Sources	16.770	16.188	11.732	10.489
<b>Totals:</b>	<b>45.849</b>	<b>44.792</b>	<b>41.506</b>	<b>33.520</b>
<b><i>Oxides of Nitrogen (NO<sub>x</sub>) Emissions in tons/day</i></b>				
Point Sources	9.312	7.231	7.876	6.343
Area Sources	5.091	5.254	5.531	5.293
Non-road Sources	7.807	8.049	8.480	6.285
Mobile Sources	30.358	29.166	23.436	18.897
<b>Totals:</b>	<b>52.568</b>	<b>49.700</b>	<b>45.323</b>	<b>36.818</b>

**Figure 1: Roanoke EAP Emissions Trends**



As can be seen by these graphics, substantial local emissions reductions are expected in the Roanoke area by 2007 as a result of a combination of local, state, and national ozone precursor control measures that address all the major emissions sectors (point, area, nonroad, and mobile). Specifically, these measures will reduce local VOC emissions by 27% and NO<sub>x</sub> emissions by 30%. In addition, significant reduction in emissions will also occur outside of the

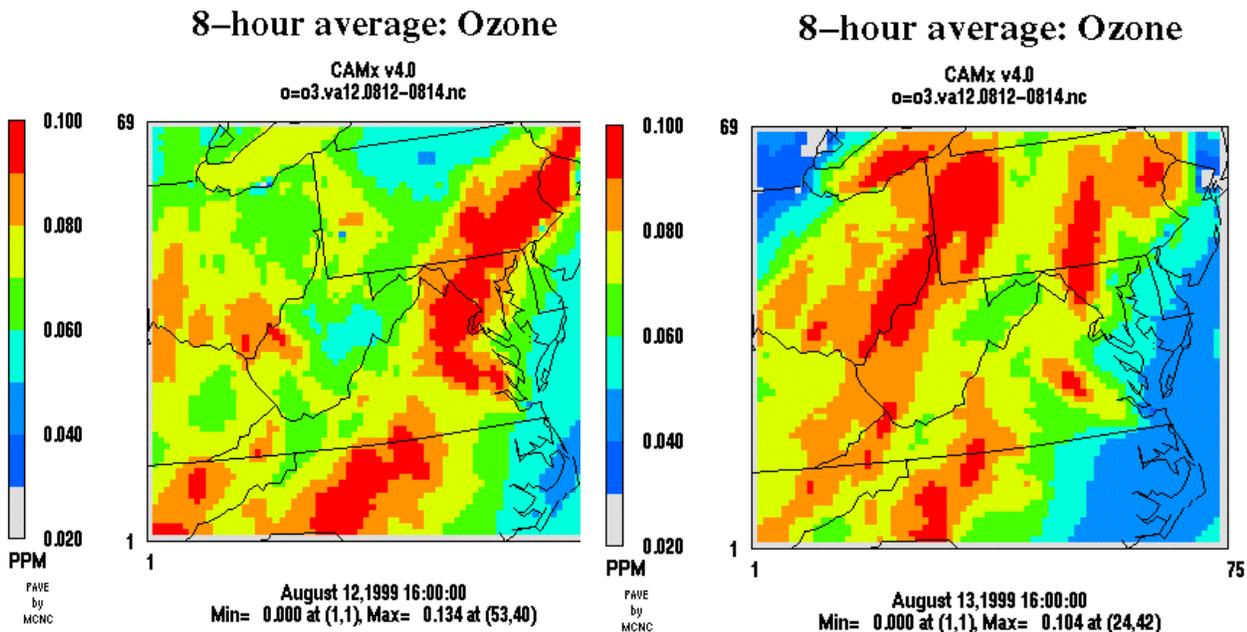
local area that will substantially reduce the transport of ozone pollution into the Roanoke area and contribute the improvement of local air quality and compliance with the ozone standard.

### **Regional Air Quality Modeling Analysis**

Regional air quality analyses using air quality predictive models are used to simulate the combination of meteorology, emissions, and atmospheric chemistry that promote ozone formation at higher ambient concentrations in a given area and during a specific timeframe. Once a representative scenario, or episode conducive to ozone formation, based on an actual observed ozone event is selected and validated, emission control and reduction strategies are tested to predict whether they would succeed in reducing ozone and attaining the ozone standard.

Such an analysis has been performed in support of the Roanoke EAC area and the results are summarized in this section. For the purpose of this analysis, an actual ozone episode that occurred in August 1999 was selected for the modeling exercise. This modeling was performed using the Comprehensive Air Quality Model with Extensions (CAM<sub>x</sub>) and related meteorological and emissions data preprocessors. A regional geographic model domain was also chosen for the analysis to account for the impact of pollution transport on the local area and the predicted reduction of this transport from regional and national control measures. This model was first run to simulate the base case episode and was successfully validated to meet EPA requirements for the use of such models for air quality planning purposes. The results of this base case (August 1999) modeling is graphically presented below:

**Figure 2: Regional Modeling Results – Base Case Episode (August 1999)**

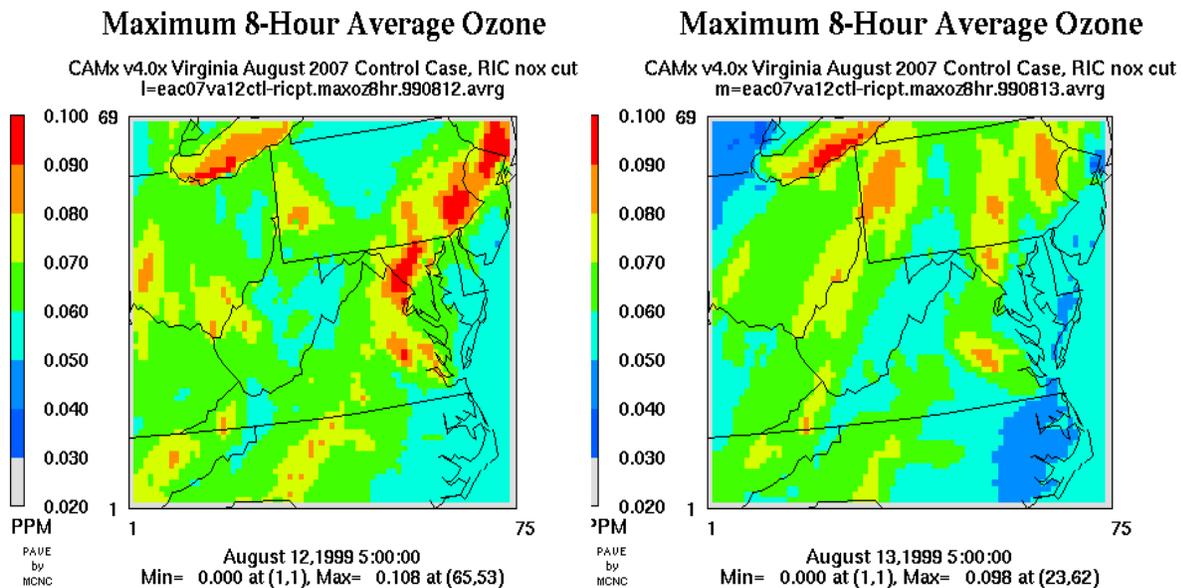


Once the base case modeling and associated performance evaluation and validation was completed, the future base and control case scenarios were modeled.

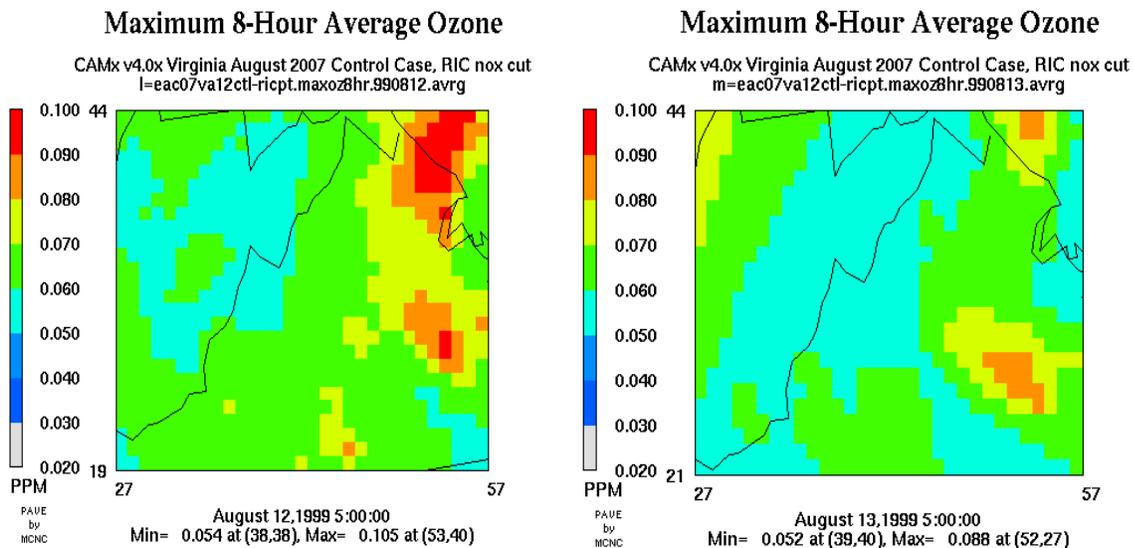
First, the future base case scenario was modeled based on the assumption of emissions growth from unregulated or uncontrolled source categories. Also included in this scenario were controlled estimates for source categories subject to State/Regional/National strategies already promulgated for the control of ozone precursor emissions that were not directly relating to the strategies to be implemented through the local control program. This modeling showed substantial reductions in predicted ozone concentrations in the EAC area and throughout the entire modeling domain. In fact, the base case controls were predicted to be sufficient to bring the Roanoke EAC area into compliance with the ozone standard.

The second future modeling scenario involved the addition of the local control strategies contained in the EAP to serve as the control case inventory for this project. The combination of all the controls at all applicable levels (local, state, federal) produced the results shown below.

**Figure 3: Regional Modeling Results – Future Control Case Predictions (full domain)**



**Figure 4: Regional Modeling Results – Future Control Case Predictions (Central VA)**



The results of the control case modeling shows that most areas within the modeling domain would be at or below the 8-hour ozone standard in 2007 under this episode scenario as a result of the control strategies to be implemented during this time period. **Specifically, the Roanoke area is predicted to experience a 22% reduction in local ozone concentrations. It is also predicted that the base case design value for the area of 90 parts per billion will be reduced to 70 parts per billion in 2007.** Therefore, the modeling exercise indicates that the desired result of reducing ozone concentrations to levels below the 8-hour ozone standard will be achieved by the implementation of the controls included in this EAP, and combined with the control strategies being implemented on the state and federal levels. A summary of the attainment demonstration results are presented in the table below:

**Table: Attainment Demonstration for the Roanoke Ozone Monitor**

Modeled Average Base-Year Daily Maximum Ozone Concentration (ppbv)	Modeled Average Future-Year Daily Maximum Ozone Concentration (ppbv)	RRF	Current DV (ppbv)	Future DV	Pass/Fail Status
79.95	62.24	0.778	90	70	Pass

#### **IV. IMPLEMENTATION STATUS OF EARLY ACTION CONTROL MEASURES**

This section describes the status of each emission control measure included in the early action plan and current plan and schedule for measure implementation.

##### **Local Phase I Controls**

##### ***Heavy Duty Diesel and Diesel Equipment Strategies***

#1 – Reduction of locomotive idling and resulting emissions. Through a local voluntary agreement, the Norfolk Southern Railroad Company will implement an internal policy to limit locomotive idling at its facilities/yards in the City of Roanoke. This measure will reduce emissions of both NO<sub>x</sub> and fine particulate matter (PM) and will be in addition to emission reductions from federal locomotive controls. A detailed estimate of these reductions is currently under development. This measure was not included in the estimate of EAP emissions reductions or in the air quality modeling exercise.

#2 – Limitation of idling times for local school bus fleets. This measure will involve the expansion of existing school bus idling restrictions to the entire EAP area. An initial estimate of reductions expected from this measure is 0.7 tons/year of NO<sub>x</sub> and an undetermined amount of PM. The City of Roanoke has initiated an engine and equipment idling policy whereby city vehicles shall not be parked with their engines idling for more than five (5) minutes unless it is essential for performance of work. Exceptions exist for public safety vehicles. As a reminder of the new policy, keychains were prepared and will be attached to all fleet vehicle keys.

#3 – Retrofit control technology for 100 Roanoke County school buses. This measure will involve the installation of oxidation catalysts on 100 school buses. An initial estimate of the reductions expected from this measure is 0.3 tons/year of VOCs, 0.07 tons/year of PM, and 1.2 tons/year of Carbon Monoxide (CO). It is likely that the City of Roanoke will also participate in this program that will increase the reduction estimate. On June 22, 2004 the Roanoke County

School Board approved a grant in the amount of \$226,644 for the retrofitting of school buses to reduce diesel emissions. The Virginia Department of Environmental Quality (VDEQ) and the United States Environmental Protection Agency (EPA) awarded the grant to retrofit 100 of the 184 buses in the school bus fleet with oxidation catalysts in order to help reduce particulate matter emissions. Roanoke County has agreed to keep these buses in service for at least three years after the projects completion.

#4 – Purchase and use of bio-diesel compatible solid waste trucks by the City of Roanoke. This measure will involve the conversion of five new garbage trucks to use bio-diesel fuels. An initial estimate of the reductions expected from this measure is approximately 250 kilograms/year of NO<sub>x</sub> and 8 kilograms/year of PM. In 2003 Roanoke City purchased five new garbage trucks that can be converted to bio-diesel. As the fleet is replaced, the city will purchase similar vehicles.

#5 – Purchase and use of ethanol compatible alternative fuel vehicles by the City of Roanoke. This measure will involve the purchase and use of up to 26 alternatively fueled vehicles. The estimate of reduction from this measure will be developed once the details are determined. At the beginning of the new fiscal year, fleet replacement will occur. The addition of hybrid and bio-ready vehicles will begin after July 1, 2004. Two flex-fuel vehicles, a GMC Yukon and Ford Explorer were recently purchased.

#6 – Purchase of bio-diesel ready trucks by the City of Roanoke. This measure involves the prior and future purchase and use of waste trucks utilizing bio-diesel fuels. The estimate of reduction from this measure will develop once the details are determined. The City is applying for an EPA Grant to further its efforts to purchase cleaner vehicles. One biodiesel compatible vehicle, a Ford van, was recently purchased.

#7 – Purchase of hybrid vehicles by the City of Roanoke. This measure will involve the purchase and use of up to four hybrid vehicles. The estimate of reduction will depend on the number of vehicles purchased and will be developed once this is determined. Purchase of these vehicles will begin after July 1, 2004.

#8 – Purchase of more efficient, low-emission, or alternative fuel vehicles by Roanoke County. A plan is currently developing for these purchases, and the reductions anticipated will be calculated once this plan is completed and approved.

#10 – Educational and training program of vehicle use by Roanoke County. The County has implemented an educational program on “effective environmental driving”. Reductions will be estimated based on observed fuel use reductions achieved after the completion of the training. Roanoke County distributed a brochure to all of its employees urging them to reduce the environmental impact of driving both company and personal vehicles. Items focused on car-pooling, planning trips, and reduction of idling. All drivers of County vehicles will receive “Effective Environmental Driving” classroom training. On a broader scale, the Ride Solutions program has been working throughout the region to raise awareness of “Smart Commuting” practices. Special Events, Public Service Announcements, Print materials, lectures and presentations continue to be the primary mediums for this approach.

### ***Air Quality Action Day, Public Education, and Stationary Source Strategies***

The center piece of the local control plan will be a comprehensive air quality (ozone) action day program which will require restrictions on ozone precursor pollutant producing activities by

state/local governments and encourage voluntary restrictions of similar activities on local businesses and the public. Through various media sources, email lists, postings, events, and announcements the region's citizens will be informed of Ozone Action Days so that they can plan to participate in implementing steps to reduce ozone. The Roanoke Valley Alleghany Regional Commission has established this communication network and tested its effectiveness. The message reached a far larger audience than expected, and we are pleased with the results.

The DEQ already issues local forecast of ozone levels for the Roanoke area during the typical ozone season. An enhanced forecasting tool for the Roanoke area is developed and will be used as part of this action day program. Another key component of this program will be an ongoing public awareness and education program to notify and inform the public on actions that they can take to reduce their individual impact on the area's air quality. The Regional Commission has employed television interviews and commercials, the Clean Commute Day Picnic and activities, a Bike to Work Day events, radio commercials and interviews, and printed articles and advertisements, road signage, and marquis announcements to raise public awareness of these initiatives. To facilitate this program, regional and local air quality coordinators will be assigned to implement and coordinate the efforts involved. The main components of the air quality action day program, along with several longer-term support activities are as follows:

#11 – Air quality action day program (hybrid approach). This program will consist of two main efforts. First, local governments have made commitments to limit or ban certain ozone precursor forming activities during predicted high ozone days. These activities will include landscaping, pesticide application, refueling vehicles, and use of other solvent based products. The State Department of Transportation, which performs many of the same activities in the local area, has also made this commitment. Secondly, voluntary restrictions on these same activities will be requested of local business and the general public during potential high ozone days. At the same time businesses and the public would be encouraged to make alternative commuter choices such as car or vanpools, public transit, telecommuting, and combining trips. The Ride Solutions program of the Roanoke Valley Alleghany Regional Commission has established a network of citizens and agencies that are willing to contribute to the efforts on these days. Through the a strong public outreach campaign, promotion of alternative commuting modes, and support services, the Ride Solutions program has grown 58.3 percent from January first to July first, 2004. This percentage reflects approximately 1.5 percent of the commuting public in the region. Furthermore, it does not reflect all of the citizens taking public transit and carpooling in the region. With continuing efforts the program hopes to register, and thus establish regular communication with, three to four percent of the regions commuting public in alternative transportation methods by 2007. Registration in the Ride Solutions program signifies a commitment to the air quality movement and willingness to promote good practices. As a contingency measure, if ozone exceedances continue or a shortfall in emission reductions is identified after plan implementation, the area will reevaluate and determine if additional mandatory restrictions are warranted.

#12 – Early morning or late evening refueling of vehicles. This measure will also have a mandatory and voluntary component. Ride Solutions' participants, Private citizens, neighborhood associations, local governments, and state agencies will restrict vehicle refueling during high ozone days until the evening. At the same time, local gasoline distributors are encouraged to provide incentives to the public to refuel early or late in the day during high ozone days. Several fueling stations have submitted pledges to support this initiative by encouraging citizens to "get fuel when it's cool". These companies include: Stop in Food Stores,

Kroger, Workman Oil, and Boxley Inc. Furthermore, the localities that compose the 5<sup>th</sup> P.D.C. have all submitted similar statements for their fleets of vehicles.

#13 – Promotion of alternative fuel vehicles. As part of the public awareness and education program, the environmental and economic benefits of alternative fuel vehicles will be identified as an encouragement to purchase these vehicles. The County of Roanoke has submitted a statement that addresses their intent to purchase alternative fuel vehicles in the coming year. The City of Roanoke has applied for an EPA grant to support a pilot project to fuel its newly acquired dual fuel compatible vehicles.

#14 – Media and public relations concerning air quality action days. A comprehensive and year-round media and public relations program has been implemented and is coordinated by the Ride Solutions Coordinator. The Ride Solutions coordinator has developed a communication network consisting of television, radio, print media, road signs, marquis, presentations, special events, email and telephone trees, and a web site to spread awareness of these issues. All of these media sources work in conjunction to deliver a concise and collaborative message throughout the region. The message is addressed to businesses, agencies, and individual citizens alike. To date, the feedback has been far-reaching and positively received.

#15 – Public transit incentives (transit passes) for college students and local employers. This will involve the purchase of at least 300 transit passes to be distributed to students and employers for use during high ozone days or year-round. All government employees in the City of Roanoke now have available to them bus vouchers to encourage them to take public transit. Furthermore, all city employees also have the “Downtown Express” a Park and Ride service that will shuttle SOV drivers from the Roanoke Civic Center into the downtown area to relieve congestion and lower emissions in the downtown area. This is a free service provided by the city. Furthermore, we are implementing the “Smart Way” a long distance shuttle along the I-81 corridor to alleviate congestion along that route.

#16 – Bicycle infrastructure and amenities. This program will encourage bicycle use during high ozone days and encourage the expansion of bicycle related infrastructure. The Roanoke Valley Alleghany Regional Commission had completed a Bike Feasibility Study of the roads in Roanoke for publication. This publication is designed to help commuters see the routes they would be able to ride in the area. A rural version of the study will be completed in the next year. Furthermore, there is work being done on greenway mapping of the Roanoke Valley to inform bikers of their routes and alternatives. The Ride Solutions Coordinator is also working with private businesses to encourage biking as an alternative mode of transportation through providing bike racks, and flex hours for employees.

- Developed a regional bicycle network that facilitates and promotes alternative transportation and recreational opportunities in the region.
- Conducted fieldwork to collect data required for Level of Service (LOS) modeling. Additional data, beyond what is required for LOS modeling, was also collected. This data was compiled to develop a comprehensive database of roadway design parameters in the Regional Bicycle Suitability Study.
- Evaluated the LOS of the study area network using the Bicycle Compatibility Index (BCI) model and the Bicycle Level of Service (BLOS) model
- Using the BCI model, recommend design alternatives to better accommodate bicyclists for selected portions of the regional network.

- Using GIS technology, produced compatibility/suitability maps for corridors comprising the regional network based on the LOS scores received from both models.
- Reviewed alternative design and operational options for segments in the regional network and LOS achieved by various options, as provided by the models.
- Compared the LOS results provided by both the BCI and LOS models using data and work products from the *Regional Bicycle Suitability Study*.
- Prepared to update the 1997 *Bikeway Plan for the Roanoke Valley Area (FY2005)*.

#17 – School (K-12 and adult education) based public education. This will involve expansion of an ongoing educational program to identify air quality issues and individual action that can be taken to reduce ozone precursor emissions at area primary and secondary schools. As we have just entered summer vacation, there is little that we can do at this point for this initiative. However, a program is currently under development for the next academic year to introduce these concepts and measures to school classes in the Roanoke Valley.

#18 – Tree canopy/ urban forestry. This will involve an area-wide comprehensive tree-planting program with the goal of reducing concentrations of certain pollutants including ozone and NO<sub>x</sub>. Roanoke City and Vinton have both expressed support for this initiative. Roanoke City has planted 500 trees thus far this year on city owned land.

#19 – Roanoke to Blacksburg public transit. Establishment of a bus route from Roanoke to Blacksburg (where Virginia Tech is located), and point in between. This will reduce vehicle trips within the compact area and produce a 0.9 ton/year reduction of NO<sub>x</sub> and 2 ton/year reduction of VOC. The bus route is established and plans to begin July 2004. The bus will be called the “Smart Way” bus. For three dollars people will be able to travel approximately 50 miles from Blacksburg to Roanoke one way. There will also be stops in Christiansburg and Salem. The Ride Solutions Coordinator for the Regional Commission is preparing a survey to research and document ridership for Valley Metro. For the first three years Valley Metro will fund the program with technical support provided by Ride Solutions. After this point, the localities that the bus services will share the cost as determined by ridership. Ride Solutions will also coordinate with Valley Metro to share advertising and clean commuting messages with the “Smart Way”.

Although it is very difficult to estimate ozone precursor emission reduction that will be achieved from these individual actions, it is not unreasonable to assume that all these actions combined will have the desired impact of reducing emissions to some extent. Through the evaluation of these types of programs in other areas, a general range of emission reductions that can be expected from the combination of these types of voluntary measures of 3% from affected activities and emissions. Therefore, an initial estimate of a 3% reduction in ozone precursor emissions from these activities in the Roanoke area has been used to estimate the reductions from the combination of these measures during predicted high ozone days. For those activities that have a state/local mandatory component, a 5% reduction estimate has been used for the purpose of determining emissions reductions. In total, this equates to a daily reduction of 1 ton/day of VOC and 1.5 tons/day of NO<sub>x</sub>.

### ***Lawn and Garden Equipment Strategies***

#20 – Replacement of gasoline golf carts with electric carts. This measure will involve obtaining commitments from up to four local golf courses to replace some or all of their golf carts with electric carts. Replacement of 100 gas carts with electric carts would produce a VOC reduction

of 25 tons over three years. One or more golf courses in each jurisdiction are being sought to participate in a pilot cart replacement program.

#21 – Gasoline powered lawnmower buyback program. This will involve providing incentives for the public to trade in gasoline powered lawnmowers for zero emissions equipment (electric or manual). Cooperative agreements are currently being sought with local hardware/warehouse businesses to begin this program.

#22 & #23 – Restrictions on the use of lawn and garden equipment. This would be another two-part control measure with mandatory restrictions the use of gasoline powered lawn and garden equipment for state/local governments and voluntary restrictions on local businesses and the public, during predicted high ozone days. Assuming a 5% percent reduction in lawn & garden emissions from this measure, VOC emissions would be reduced by 0.2 tons/day. Commitments of all the localities involved have been obtained to implement this episodic measure. This measure will be incorporated into the overall ozone action days program that was previously described.

#24 – Open burning bans/restrictions. Several jurisdictions have adopted local rules restricting or prohibiting open burning. The other EAP jurisdictions will ban or restrict open burning during predicted high ozone days. This will reduce area emissions by 0.56 tons/day of VOC, and 0.24 tons/day of NO<sub>x</sub>. This measure will also be incorporated into the overall ozone action days program that was previously described

### **State/Federal Control Measures**

In addition to the local strategies identified in the preceding discussion, several state and federal actions that have or will produce substantial ozone precursor emission reductions both inside and outside of the Roanoke area. These reductions are aimed at reducing local emissions and the movement (transport) of pollution into the area. These strategies, when combined with the local strategies, are expected to lower area ozone concentrations to the level at or below the ozone standard.

### ***State Control & Support Measures***

At the state level, five significant actions have been taken to support ozone standard attainment in Virginia and specifically in the EAC area.

- Regional ozone transport control program (i.e., the NO<sub>x</sub> SIP Call)
- National Low Emission Vehicle Program (VA early opt-in beginning in 1999)
- Reasonably Available Control Technology (RACT) controls for existing industries
- Enhanced ozone forecasting tool for the Roanoke area
- Stage I vapor recovery at service stations

#### **1. Regional Reduction of NO<sub>x</sub> Emissions (NO<sub>x</sub> SIP Call)**

In response to EPA's call for the reduction of NO<sub>x</sub> emissions from large combustion sources (i.e., the NO<sub>x</sub> SIP Call), the state has adopted and implemented a program to significantly reduce emissions on NO<sub>x</sub> as part of a regional program to reduce ozone transport.

On May 21, 2002 the Virginia Air Pollution Control Board adopted a final state regulation concerning the NO<sub>x</sub> Budget and Emissions Trading program, 9 VAC 5 Chapter 140, in response to the EPA NO<sub>x</sub> SIP Call. The final regulation was published in the Virginia Register on June 17, 2002 and became effective on July 17, 2002. On June 25, 2002, the regulation was submitted to EPA along with the initial allocations for the affected units. On November 12, 2002, EPA issued a notice proposing approval of the state program, with the exception of the NO<sub>x</sub> allowance banking provisions dealing with the start date of flow control. This deficiency has subsequently been corrected and submitted to EPA for full final approval of the state program.

This program alone is predicted to reduce ozone forming NO<sub>x</sub> emissions by up to 30,000 tons per ozone season in Virginia. Beginning on May 31, 2004, facilities and emission units subject to the state NO<sub>x</sub> budget and trading rule must comply with this rule during the control period of from May to September of every year hence forth. As part of this program, affected sources must adhere to emission rates and caps unless additional emission allowances are obtained through the EPA administered trading program.

## 2. National Low Emission Vehicle Program

The National Low Emissions Vehicle (NLEV) program is a voluntary clean vehicle program established by EPA through national regulation on December 16, 1997. Due to the voluntary nature of the program, it was contingent upon agreement by northeastern states (including Virginia) and the major auto manufacturers. Virginia opted into this program for lower vehicle standards, beginning model year 1999 vehicles as part of the initial startup of this program. Virginia subsequently adopted a state NLEV regulation, 9 VAC 5 Chapter 200, which became effective on April 14, 1999.

This program has and will continue to substantial ozone precursor emission reductions in Virginia that will assist areas like the Roanoke area in meeting air quality standards and goals.

## 3. Reasonably Available Control Technology (RACT) controls for existing industries

To address local emissions, the state has recently adopted Reasonably Available Control Technology (RACT) controls for industries in the area, to further reduce the local contribution to ozone formation. This regulation was adopted by the Air Pollution Control Board in October 2003 and became effective on March 23, 2004. Compliance with this rule will be required by November 15, 2005. Because this measure has specifically been adopted to support the Early Action Plan, this measure has been included and modeled as a local control measure.

Regional Office activities relating to RACT implementation:

### A. Agency training

- In January, WCRO and VRO conference called with Air Program members of the NRO and Central Office to discuss issues concerning RACT as required for an emission control area.

### B. Steps taken to regulate industry

- We expect the regulatory implementations (NO<sub>x</sub> RACT) that became effective on March 24, 2004 to have an impact on NO<sub>x</sub> concentrations emitted in the compact area.
- Current DEQ databases were searched for facilities that emit nitrogen oxide (NO<sub>x</sub>) in the compact area.

- Three Potential NO<sub>x</sub> RACT sources identified in the affected geographic area that exceed TPTE of 100 tpy are as follows (TPTE = theoretical potential to emit; tpy = tons per year).
- These sources were notified of the impact of the new regulations on their NO<sub>x</sub> emissions by letter dated March 5, 2004. All sources submitted their NO<sub>x</sub>-RACT plans as required on or before June 25, 2004.
- These plans are being developed into State Operating Permits with the intention of incorporating them into the SIP. Public participation will ensue late this summer and autumn.

#### General Public Awareness and Education

The DEQ regional office is developing a brochure for public distribution concerning the importance of maintaining an environmentally good record with respect to ozone. The document targets adults who drive on area roads, and who use gasoline powered devices to work on the farm and home. It compliments the educational materials being developed by Early Action Compact members. The brochure will be published and ready for distribution late this summer. Methods of disseminating the brochure are being investigated.

#### 4. Enhanced Ozone forecasting tool for the Roanoke Area

Although not a direct control measure, the DEQ has initiated a contract with Sonoma Technology, Inc. to develop an area specific ozone forecast tool to support the local ozone action days program and associated voluntary emission reduction efforts. A draft version of this tool has been provided and is currently undergoing testing. A pilot test of the enhanced local forecast and action program may occur later this summer, with full implementation to begin during the 2005 ozone season.

#### 5. Stage I Vapor Recovery at local service stations

Article 27 of 9 VAC 5 Chapter 40 establishes emission standards for petroleum liquid storage and transfer operations. 9 VAC 5-40-5200 B. 3. requires the installation and use of stage I vapor control systems at service stations in Roanoke County and the Cities of Roanoke and Salem. The gasoline bulk loading at bulk terminals control requirements have also been extended into Bedford County.

#### ***Federal Control Measures***

On the federal level, numerous EPA programs have been or will be implemented to reduce ozone pollution. These programs cover all the major categories of ozone generating pollutants and are designed to assist many areas to come into compliance with the federal ozone standard. A brief description of these strategies is provided below:

##### Stationary & Area Source Controls

In addition NO<sub>x</sub> SIP Call program, the EPA has developed a number of control programs to address smaller "area" sources of emissions that are significant contributors to ozone formation. These programs reduce emissions from such sources as industrial/architectural paints, vehicle paints, metal cleaning products, and selected consumer products.

##### Motor Vehicle Controls

The EPA continues to make significant progress in reducing motor vehicle emissions. Several federal programs have established more stringent engine and associated vehicle standards on cars, sport utility vehicles, and large trucks. These programs combined are expected to produce progressively larger emission reductions over the next twenty years as new vehicles replace older ones.

#### Non-Road Vehicle & Equipment Standards

The category of “non-road” sources that covers everything from lawn & garden equipment to aircraft, has become a significant source of air pollutant emissions. In response, EPA has adopted a series of strategies to address these sources. These programs include engine emission standards for lawn & garden equipment, construction equipment, boat engines, and locomotives.

All these measure have been developed to address both the creation of ozone producing emissions in the local area, as well as reducing the movement of ozone into the area as a comprehensive approach to reducing ozone levels.

### **V. STATE IMPLEMENTATION PLAN (SIP) DEVELOPMENT AND SCHEDULE**

The next major milestone in the EAC process is the development and submission of a formal State Implementation Plan (SIP) by DEQ. This SIP must be developed, processed, and submitted to EPA by December 31, 2004. This SIP will include the early action plan for the area along with any formally adopted control measures and regulations. The current schedule for this action is as follows:

**March 24, 2004** – State RACT regulation adopted.

**March 31, 2004** – Area attainment demonstration completed.

**June to October, 2004** – Continued local area control development and adoption (as needed).

**November, 2004** – Final SIP development and public review/comment.

**December 31, 2004** – SIP submission to EPA.

Currently no major obstacles are anticipated in completing the SIP process and meeting the milestone commitment.